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NATIONAL DAM INSPECTION PROGRAM. LAKE STONEYCREEK DAM (NDI ID N--ETC(U)
JUN 78 DACW31-78-C-0049

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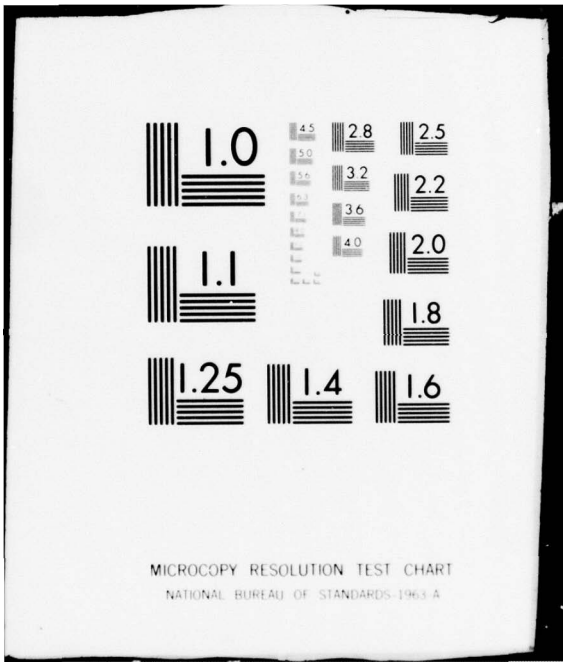
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

LEVEL II

3 OHIO RIVER BASIN
RHOADS CREEK, SOMERSET COUNTY

PENNSYLVANIA

2 LAKE STONEYCREEK DAM

NDI I.D. NO: 227

4 PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

(21) ORIGINAL CONTAINS COLOR PLATES: ALL DDC REPRODUCTIONS WILL BE IN BLACK AND WHITE.

(6) National Dam Inspection Program. Lake Stoneycreek Dam (NDI ID Number 227), Ohio River Basin, Rhoads Creek, Somerset County, Pennsylvania. Phase I Inspection Report.

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
BALTIMORE, MARYLAND 21203

(15) DACW31-78-C-0049
BY

D'APPOLONIA CONSULTING ENGINEERS
10 DUFF ROAD
PITTSBURGH, PA. 15235

(12) 64p.

(11) JUNE 1978

411001

LEVEL II

(1)

ORIGINAL CONTAINS COLOR PLATES: ALL DDC REPRODUCTIONS WILL BE IN BLACK AND WHITE.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Lake Stoneycreek Dam
STATE LOCATED: Pennsylvania
STREAM: Rhoads Creek, tributary of Stoney Creek, tributary of Conemaugh River
DATE OF INSPECTION: May 18 and 30, 1978

(cont'd p 1)

ASSESSMENT: Based on the evaluation of the conditions as they existed on the dates of inspection, as revealed by the visual observations, and the review of available information, the condition of Lake Stoneycreek is considered to be fair.

Although the primary and emergency spillways of the dam have sufficient cross-sectional area to pass the recommended spillway design discharge (probable maximum flood) without overtopping, the emergency spillway crest lacks erosion protection and has no well-defined discharge channel. Therefore, flow over this spillway will constitute a threat to the integrity of the earth embankment.

It is recommended that the owner should take appropriate action as soon as possible to provide adequate erosion protection in the emergency spillway, evaluate the adequacy of the riprap at the entrance of the primary spillway, and remove the brush on the upstream face of the dam. It is also recommended that the owner should evaluate the need for placing an upstream control at the outlet pipe and installing instrumentation in the embankment.

It is further recommended that the owner should develop a formal warning system to alert the downstream residents in the event of emergencies.

Lawrence D. Andersen

Lawrence D. Andersen, P.E.
Vice President

APPROVED BY:

G. K. WITHERS
Colonel, Corps of Engineers
District Engineer

DATE: 31 Jul 78

Contract DACW31-78-C-0049

LAKE STONEYCREEK DAM
MAY 16, 1978

Upstream Face

Downstream Face

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TABLE OF CONTENTS
(Continued)

PHASE I
NATIONAL DAM INSPECTION PROGRAM
LAKE STONEYCREEK DAM
NDI I.D. NO. 227
DER I.D. NO. 56-97

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes hazard to human life or property.

1.2 Description of Project → Lake Stoneycreek Dam

a. Dam and Appurtenances. The dam consists of an earth embankment 900 feet long, with a maximum height of 31 feet from the downstream toe. The dam has a concrete lined primary spillway over the embankment near the left abutment (looking downstream) and an earth channel emergency spillway around the right abutment. (Plate 1). The outlet for the reservoir consists of a concrete encased, 36-inch corrugated metal pipe located about the center of the embankment. Flow through the outlet pipe is controlled by a sluice gate located at the downstream end of the pipe at the toe of the dam. This pipe is the only emergency drawdown facility for the reservoir. The impoundment capacity at normal pool level is estimated to be about 2000 acre-feet.

b. Location. Lake Stoneycreek Dam is located on Rhoads Creek, one mile east of Shanksville in Stoneycreek Township, Somerset County, Pennsylvania. The reservoir is immediately downstream of Indian Lake, which impounds a tributary of Rhoads Creek (Plate 2).

The discharge from the dam flows into Rhoads Creek, which passes through the eastern edge of Shanksville and joins Stoney Creek about 1000 feet south of the town. A major portion of Shanksville, which includes about 50 homes and various commercial buildings, is within the flood plain of Rhoads Creek in the event of failure of Lake Stoneycreek Dam. Therefore, failure of the dam would cause considerable loss of life and property damage in Shanksville.

The storage capacity of Indian Lake Dam (19,200 acre-feet) being significantly larger than the surcharge storage volume of Lake Stoneycreek (about 4050 acre-feet) indicates that failure of Indian Lake would cause overtopping and probable failure of Lake Stoneycreek Dam also.

c. Size Classification. Intermediate (based on 2000 acre-feet storage).

d. Hazard Classification. High.

e. Ownership. Stoneycreek Valley Development Corporation. (Address: Mr. Therman Korns, President, Lake Stoneycreek Owners Association, R. D. 3, Stoystown, Pennsylvania 15663)

f. Purpose of Dam. Recreation.

g. Design and Construction. The dam was designed by The Neilan Engineers, Inc., of Somerset, Pennsylvania, in 1959. The dam was constructed by Robert A. Long Construction Company of Central City, Pennsylvania. Construction was completed in 1960.

h. Normal Operating Procedure. The reservoir is maintained at the primary spillway crest, Elevation 2226, leaving 15 feet of of freeboard at the top of the dam. All normal flow is discharged through the primary spillway. The emergency spillway crest is at Elevation 2233.5.

3.1 Pertinent Data

a. Drainage Area - 26.2 square miles

b. Discharge at Dam Site

Maximum known flood at dam site - Tropical storm Agnes, 1972, approximately 7 feet over primary spillway (2800 cfs)
Warm water outlet at pool elevation - N/A
Diversion tunnel low pool outlet at pool elevation - N/A
Diversion tunnel outlet at pool elevation - N/A
Gated spillway capacity at pool elevation - N/A
Gated spillway capacity at maximum pool elevation - N/A
Ungated spillway capacity at maximum pool elevation - 27,400 cfs at Elevation 2241
Total spillway capacity at maximum pool elevation - 27,400 cfs at Elevation 2241

c. Elevation (USGS Datum) (feet)

Top of dam - 2241
Maximum pool-design surcharge - N/A

Full flood control pool - N/A
Recreation pool - 2226
Spillway crest - Primary, 2226; Emergency, 2233.5
Upstream portal invert diversion tunnel - 2211
Downstream portal invert diversion tunnel - 2210
Streambed at center line of dam - 2210
Maximum tailwater - 2220 (Estimated)

d. Reservoir (feet)

Length of maximum pool - 15,000± at Elevation 22 center line
Length of recreation pool - 13,000 (Normal) at Elevation 2226
Length of flood control pool - N/A

e. Storage (acre-feet)

Recreation pool (normal pool) - 2000 (Estimated)
Flood control pool - N/A
Design surcharge - 4050 at Elevation 2233.5
Top of dam - 6050 at Elevation 2241

f. Reservoir Surface (acres)

Top of dam - 400
Maximum pool - N/A
Flood control pool - N/A
Recreation pool - 170 (Normal)
Spillway crest - 170

g. Dam

Type - Earth
Length (crest excluding spillway) - 900 feet
Height - 31 feet
Top width - 10 feet
Side slopes - 2:1, downstream; 2.5:1, upstream
Zoning - No
Impervious core - No
Cutoff - Yes
Grout curtain - Unknown

h. Diversion and Regulating Tunnel

Type - 36-inch CMP pipe
Length - 125± feet
Closure - Downstream sluice gate
Access - Valve pit at downstream toe
Regulating facilities - Manual operation

i. Spillway

	PRIMARY	EMERGENCY
Type	Trapezoidal Weir	Broad-Crested Weir
Length	38 feet (bottom width)	250 feet
Crest Elevation	2226 feet	2233.5 feet
Gates	None	None
Upstream Channel	Lake	Lake
Downstream Channel	Rhoads Creek	No defined channel

SECTION 2
ENGINEERING DATA

2.1 Design

a. Data Available.

(1) Hydrology and Hydraulics. A report prepared by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER), dated October 6, 1959, summarizes most of the hydrologic and hydraulic design data which are available for the project. The report states the criteria used for the design of the spillway.

(2) Embankment. Only construction drawings are available. The 1959 report summarizes various features of the embankment.

(3) Appurtenant Structures. Structural design data for the appurtenant structures were not available.

b. Design Features.

(1) Embankment. A review of design drawings shows the following features of the project:

(a) As designed, the dam is a homogeneous embankment, with a cutoff trench (Plate 3).

(b) The embankment was designed to have an upstream slope of 2-1/2 to one (horizontal to vertical) and downstream slope of two to one.

(2) Appurtenant Structures. The appurtenant structures for the dam consist of primary and emergency spillways and outlet works. The primary spillway is a concrete weir in a trapezoidal channel (Plates 4 and 5). The uncontrolled weir crest is at Elevation 2226. The spillway channel is 38 feet wide at the weir crest and 98 feet wide at the dam crest. The weir discharges onto a 15-foot-long concrete apron, which in turn flows into a riprapped, trapezoidal discharge channel. The emergency spillway is located on the right abutment. As designed, the emergency spillway is 250 feet wide and the crest is at Elevation 2233.5. It was partially constructed in 1968 by excavation of a portion of the embankment and right abutment, but the discharge channel was never constructed. The outlet pipe for the dam is a concrete encased, 36-inch corrugated metal pipe. Flow through the pipe is controlled by a sluice gate on the downstream end of the pipe. The design includes cutoff collars around the pipe to control seepage along the pipe.

c. Design Data

(1) Hydrology and Hydraulics. The 1959 PennDER report states that according to the criteria in effect at the time of the design, the spillway was required to pass 14,500 cubic feet per second (cfs). It is further stated that the spillway is capable of passing 15,800 cfs (no freeboard specified), according to the information submitted to the state.

(2) Dam. No design data were available on the geotechnical analyses of the dam.

(3) Appurtenant Structures. No design data were found relative to the design of appurtenant structures. Only the design capacity of the spillway was included in the 1959 state report.

2.2 Construction. Available information on the construction of the dam is limited. It includes several construction progress reports prepared by the Neilan Engineers and by the state. To the extent that it can be determined, the construction of the dam was apparently conducted according to design drawings.

2.3 Operation. There are no formal operating records available for the dam. The dam is a recreational lake and outflow discharges through an uncontrolled primary spillway.

A 36-inch pipe controlled by a downstream sluice gate is the only low-level outlet facility for the reservoir.

2.4 Other Investigations. The available information includes various state reports prepared prior to, during, and after construction. The dam was inspected by the state in 1963, 1972, and 1976. The reports of these inspections are available in state files.

2.5 Evaluation

a. Availability. Limited engineering data for the dam are available in the PennDER files.

b. Adequacy

(1) Hydrology and Hydraulics. Available engineering data are not adequate to assess the structure. Only the design capacity of the primary spillway is reported.

(2) Embankment. Available information is not adequate to assess the conformity of the geotechnical aspects of the design to the currently accepted practice for such analysis. No reference to stability analysis was found.

(3) Appurtenant Structures. The flow from the corrugated metal pipe through the embankment is controlled by a valve located at the downstream end of the pipe. Therefore, the pipe is always under pressure through the dam. Design drawings indicate that the drainpipe is encased in concrete. The condition of the drainpipe could not be assessed in this inspection.

c. Operating Records. There are no formal operating records for the dam. To the best knowledge of the Lot Owners' Association Manager, the highest lake level was attained during tropical storm Agnes in 1972, when the lake was about seven feet above normal pool level.

d. Post-Construction Records. A 1962 state inspection revealed that many cottages and other structures had been built below the crest of the dam and therefore were subjected to flooding during high pool levels. The state requested that the width of the spillway be increased. In 1966, plans were submitted to the state by the Neilan Engineers, Inc., for the construction of a 250-foot-wide emergency spillway on the right abutment. Plans required excavation of a portion of the embankment and the abutment to provide the required spillway width, and the construction of a dike along the toe of the dam to direct the water away from the toe. Upon review of the plans, the state requested that riprap be placed on the portion of the channel against the embankment.

This inspection revealed that the dike along the toe of the dam was not constructed nor was the riprap placed as requested by the state. The spillway channel was excavated in 1968.

e. Seismic Stability. The dam is located in Seismic Zone 1, and based on visual observations, the static stability of the dam is considered adequate. Therefore, based on the recommended criteria for evaluation of seismic stability of dams, the structure is assumed to present no hazard from earthquakes.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The on-site inspection of Lake Stoneycreek Dam consisted of:

1. Visual inspection of the embankment, abutments, and embankment toe.

2. Visual examination of the spillway and its components, the downstream end of the outlet pipe, and other appurtenant features.

3. Observation factors affecting the runoff potential of the drainage basin.

4. Evaluation of downstream area hazard potential.

The specific observations are illustrated in Plate 6 and in the photographs in Appendix C.

b. Dam. The general inspection of the dam consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing general maintenance conditions, vegetative cover, erosion, and other surficial features.

1. Numerous swampy areas were observed below the toe of the dam. No perceivable seepage flow was associated with these wet areas.

2. One concentrated seepage point was found on the slope of the primary discharge channel. Flow was estimated to be two to three gallons per minute.

3. It was observed that the emergency spillway was not built according to the plans. It lacks erosion protection and has no defined discharge channel.

4. The upstream face of the dam was covered with brush and trees five to eight feet high and one to two inches in diameter.

5. A portion of the downstream slope showed signs of minor erosion.

c. Appurtenant Structures. The primary spillway crest and discharge channel were examined for deterioration of the concrete and other signs of distress and obstructions that would limit the flow. The riprap at the approach channel of the primary spillway was considered to be inadequate to prevent undermining of the concrete slabs of the primary spillway. Only minor bank erosion was observed on the discharge channel of the primary spillway.

The drainpipe valve was operated and found to be functional. However, significant leakage around the gate was observed, indicating that the sluice gate is not properly seated.

d. Reservoir Area. The watershed is predominantly covered with woodlands and pasturelands and infiltration capacity is estimated to be good. A small portion of the drainage basin has been strip mined.

The shorelines are not considered to be susceptible to massive landslides which would affect the storage volume of the reservoir or cause overtopping of the dam by displaced water.

It was estimated that approximately 50 dwellings are located below the crest elevation of the dam and would be subject to flooding in the event of high flows into the lake.

e. Downstream Channel. Rhoads Creek downstream from the dam flows less than one mile before discharging into Stoney Creek. In this reach, the stream passes through Shanksville and there is one bridge over the stream. A sketch and a photograph of this bridge is included in Appendices A and C, respectively. Further description of the downstream channel is included in Section 1.2.

3.2 Evaluation. In general, the condition of the dam is considered to be fair. The most significant condition at the dam is the lack of erosion protection in the emergency spillway channel. This condition is considered to be a threat to the integrity of the embankment in the event of flow over this spillway.

Riprap at the entrance channel of the primary spillway is considered to be inadequate to provide sufficient erosion protection during high flows.

The drainpipe for the dam is controlled by a gate on the downstream dam and, therefore, it is always under pressure. The structural integrity of this appurtenance could not be assessed in this inspection.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedures. Review of the design drawings and field observations indicates that there are no formal procedures for operating the dam. The only operational feature of the dam which may affect the safety of the dam is the outlet pipe sluice gate, in case it is required to lower the reservoir.

The clearing of debris from the spillway as required and continued inspection of the facilities are the principal maintenance operations which would affect safety.

4.2 Maintenance of the Dam. The maintenance condition of the dam is fair. The upstream face of the dam was covered with patches of brush and trees from 5 to 8 feet high. There is no formal dam tender responsible for the maintenance of the dam.

4.3 Maintenance of Operating Facilities. The only operational feature of the dam is the drainpipe gate. On the date of inspection it was operated and found to be functional. However, significant leakage was observed between the gate and gate guide, indicating that the sluice gate is not adequately seated.

4.4 Warning System in Effect. There is no formal warning system in effect. Telephone communication is available via residences in the vicinity of the dam.

4.5 Evaluation. The maintenance condition of the dam is assessed to be fair. It is considered that the dam is accessible under all weather conditions for inspection and emergency action.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. Lake Stoney Creek has a watershed area of 26.2 square miles and impounds a reservoir with a surface area of 170 acres at normal pool level. A trapezoidal concrete overflow weir structure near the left abutment and a 250-foot-wide earth channel emergency spillway on the right abutment constitute the flood discharge facilities for the impoundment. The flow through the primary spillway is controlled by a weir at Elevation 2226, 15 feet below the dam crest at Elevation 2241. The emergency spillway crest is at Elevation 2233.5. The spillways have a maximum combined discharge capacity of 27,400 cfs with no freeboard.

b. Experience Data. As previously stated, Lake Stoney Creek Dam is classified to be an "intermediate" size dam in the "high" hazard category. Under the recommended criteria for evaluating emergency spillway discharge capacity, such impoundments are required to pass the probable maximum flood (PMF).

The adequacy of the spillway was analyzed based on the simplified procedure developed by the Baltimore District, Corps of Engineers (Appendix D). The analysis was conducted by conservatively neglecting the retaining effect of the upstream impoundment (Indian Lake Dam) and was found that Lake Stoneycreek can pass this flow without overtopping; therefore, further analysis was not performed. This conservative analysis shows that the PMF inflow hydrograph would have a peak of 30,000 cfs and a total volume of approximately 36,500 acre-feet. Further analysis according to the procedure indicates that the flood storage volume of the dam is large enough to reduce the peak inflow and the dam can pass the recommended PMF design inflow without overtopping.

c. Visual Observations. Field observations showed that the emergency spillway lacks erosion protection. Therefore, flow over this section is considered to constitute a threat to the integrity of the embankment. A significant portion of the emergency spillway section is located over the embankment fill material and could rapidly erode in the even of flows over this section, resulting in breaching of the dam.

d. Overtopping Potential. As stated above, the spillway can pass the PMF without the dam being overtopped.

e. Spillway Adequacy. The spillway can pass the PMF, therefore, it is classified as adequate. However, flow over the emergency spillway is considered to be a threat to the integrity of the dam due to lack of erosion protection in this spillway.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Embankment. As discussed in Section 3, the field observations did not reveal any significant signs of distress that might affect the short-term stability of the embankment. However, flows over the emergency spillway could be a threat to the stability of the dam by eroding the toe of the embankment.

(2) Appurtenant Structures. The structural condition of the primary spillway is considered to be adequate. However, additional riprap on the sides of the approach channel is required to prevent undermining and damage to the concrete sections during high flows.

As previously discussed, the emergency spillway lacks erosion protection.

The structural condition of the drainpipe could not be assessed.

b. Design and Construction Data

(1) Dam. Available design and construction information consisted of design drawings and various construction progress reports prepared by the engineer and the state. No reference to a subsurface investigation, laboratory testing, or a stability analysis was found. Review of the available design drawings indicates that the design did not incorporate formal provisions to control seepage through the dam, such as internal drainage systems and zoning of the embankment.

(2) Appurtenant Structures. Review of the design drawings indicates that the emergency spillway constructed in 1968 was not built in accordance with the plans. A dike shown in the plans to protect the toe of the embankment from flows discharging from the emergency spillway was not constructed. The crest of the spillway lacks erosion protection.

c. Operating Records. The structural stability of the dam is not considered to be affected by the operational features of the dam.

d. Post-Construction Changes. An emergency spillway was constructed in 1968. The details of this post-construction change have been discussed in previous sections.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety. The visual observations indicate that the condition of Lake Stoneycreek Dam is fair. Although the combined capacity of the two spillways is adequate to pass the recommended design flood of probable maximum flood, the emergency spillway requires erosion protection so that flows over this section would not threaten the integrity of the embankment. Very limited information was available with respect to the geotechnical design of the dam to assess the conformity of the design to currently accepted practice for such an analysis. It was noted that the design did not incorporate such features as embankment zoning and internal drainage systems to control seepage through the embankment. However, field observations did not reveal any significant signs of distress, and none were reported in the past. It appears that the dam was built with reasonable care.

b. Adequacy of Information. The available information in conjunction with visual observations and the previous experience of the inspectors are considered to be sufficient to make a reasonable assessment of the condition of the dam.

c. Urgency. The following recommendations should be implemented as soon as practicable or on a continued basis.

d. Necessity for Further Investigation. The condition of the dam does not require further investigation at this time.

7.2 Recommendations/Remedial Measures

1. The owner should provide appropriate erosion protection and an adequate downstream channel to minimize the threat to the integrity of the embankment in the event of flow through the emergency spillway.

2. Additional riprap should be provided along the sides of the primary spillway approach channel to protect the concrete section of the primary spillway during high flows.

3. Trees and brush should be removed from the upstream face of the dam.

4. Since the adequacy of the concrete encasement around the drainpipe through the embankment could not be reliably assessed, the owner should evaluate the structural integrity of the pipe and the casing and investigate the need for placing an upstream control on the pipe. Also, he should develop an emergency plan to block the upstream end of the pipe to control the flow in the event the pipe or the downstream gate ruptures.

5. In view of the lack of designed seepage control features in the embankment, such as filter blankets, toe drains, etc., it is recommended that the owner should evaluate the need for installing instrumentaion (piezometers) to quantitatively monitor its performance.

6. The dam and appurtenant structures should be inspected regularly and any unusual conditions should be reported to the appropriate authorities. During these inspections, special attention should be directed to the wet areas below the toe of the dam to assure that major seepages through these areas are not developing.

7. It is recommended that the owner should develop a formal warning system to alert the downstream residents in the event of emergencies.

PLATES

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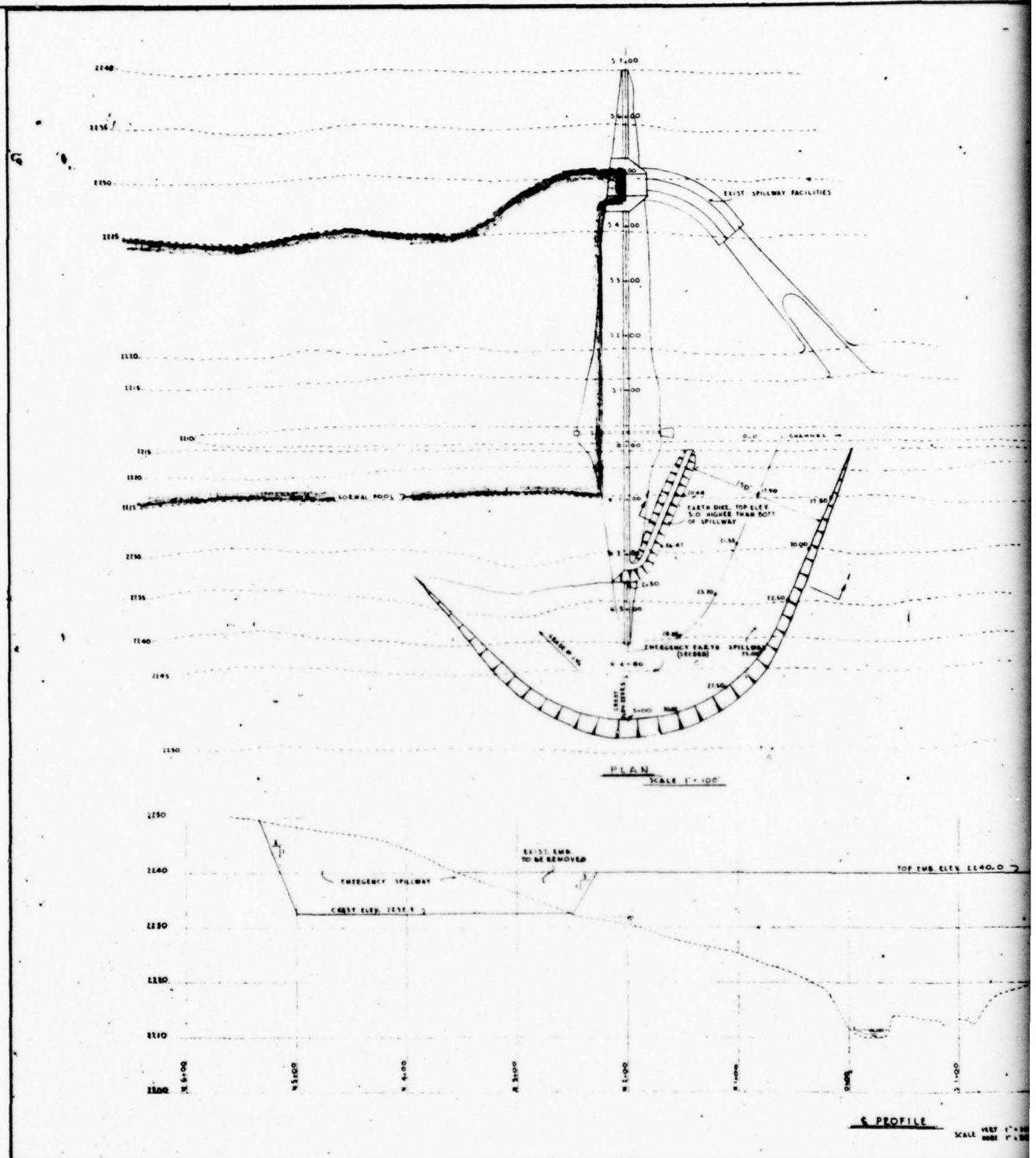
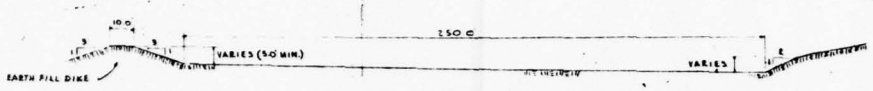
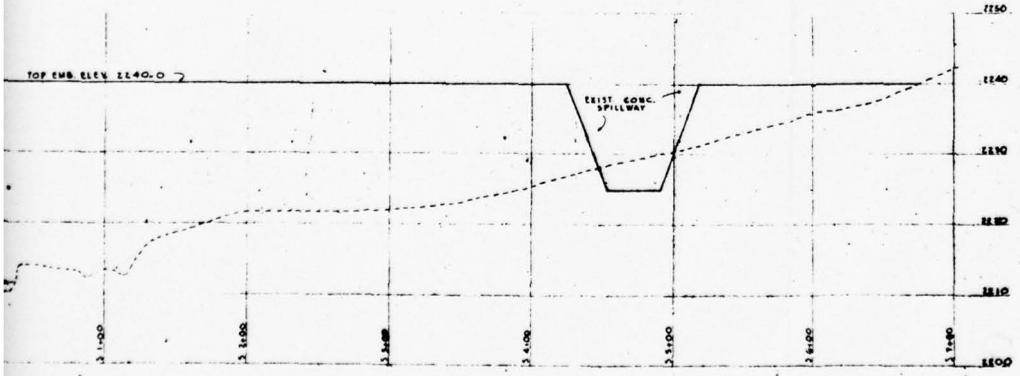
	5-25-78	APPROVED BY	JMP	7/6/78	



FIELD NOTES	REFERENCE DRAWINGS



SECTION H (TYPICAL)
SCALE 1" = 50'

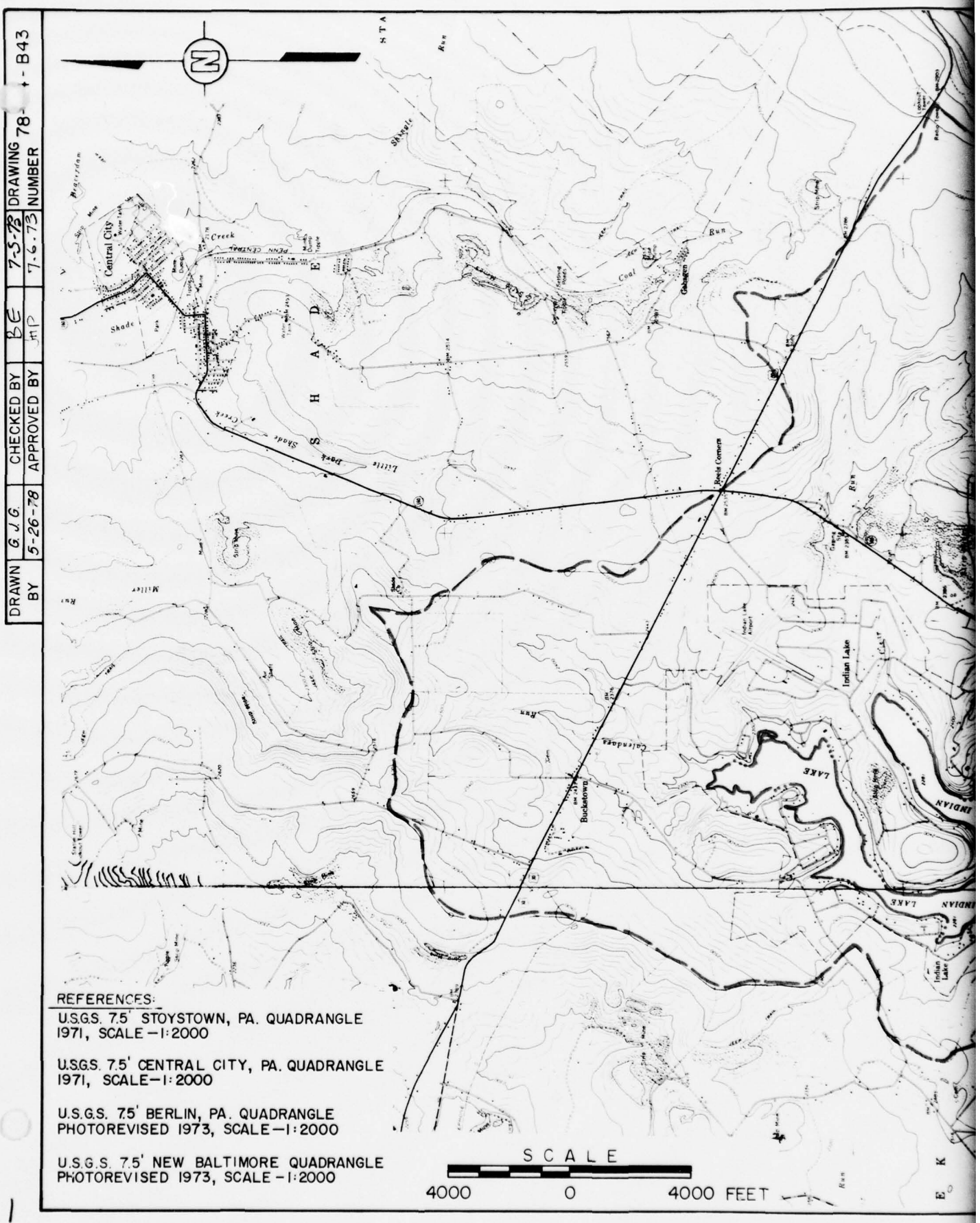


PROFILE
SCALE VERT 1" = 10'
HORZ 1" = 50'

E DRAWINGS	REVISIONS			EMERGENCY SPILLWAY PLAN, PROFILE & SECTION	LAKE STONYCREEK
	DATE	REMARKS	BY		
				THE [illegible] INC.	

PLATE I

D'APPOLONIA



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		APPROVED BY	J.H.P. 7-6-78		

REFERENCES:

U.S.G.S. 7.5' STOYSTOWN, PA. QUADRANGLE
1971, SCALE - 1:2000

U.S.G.S. 7.5' CENTRAL CITY, PA. QUADRANGLE
1971, SCALE - 1:2000

U.S.G.S. 7.5' BERLIN, PA. QUADRANGLE
PHOTOREVISED 1973, SCALE - 1:2000

U.S.G.S. 7.5' NEW BALTIMORE QUADRANGLE
PHOTOREVISED 1973, SCALE - 1:2000

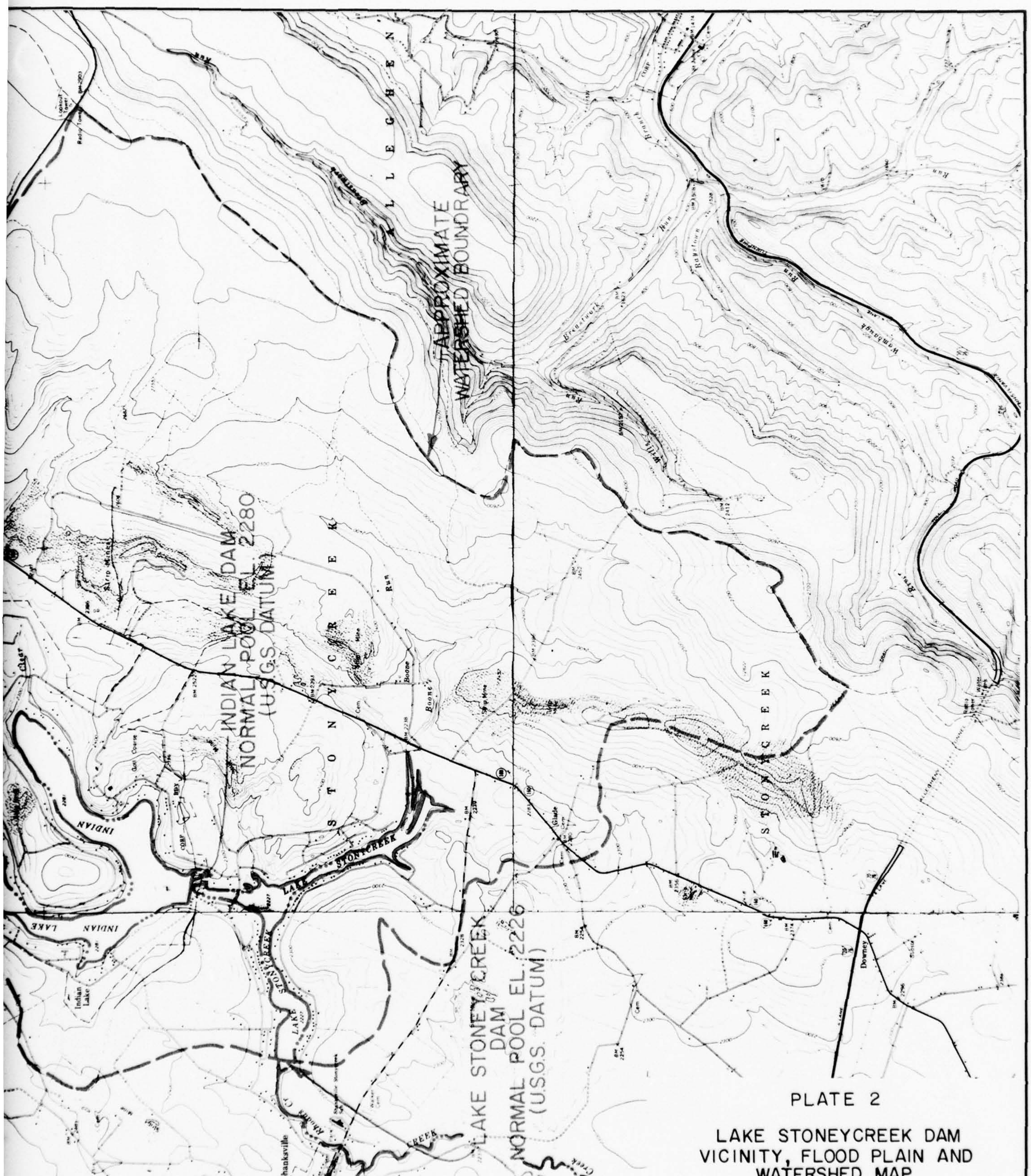

PLATE 2

LAKE STONEYCREEK DAM
VICINITY, FLOOD PLAIN AND
WATERSHED MAP

D'APPOLONIA

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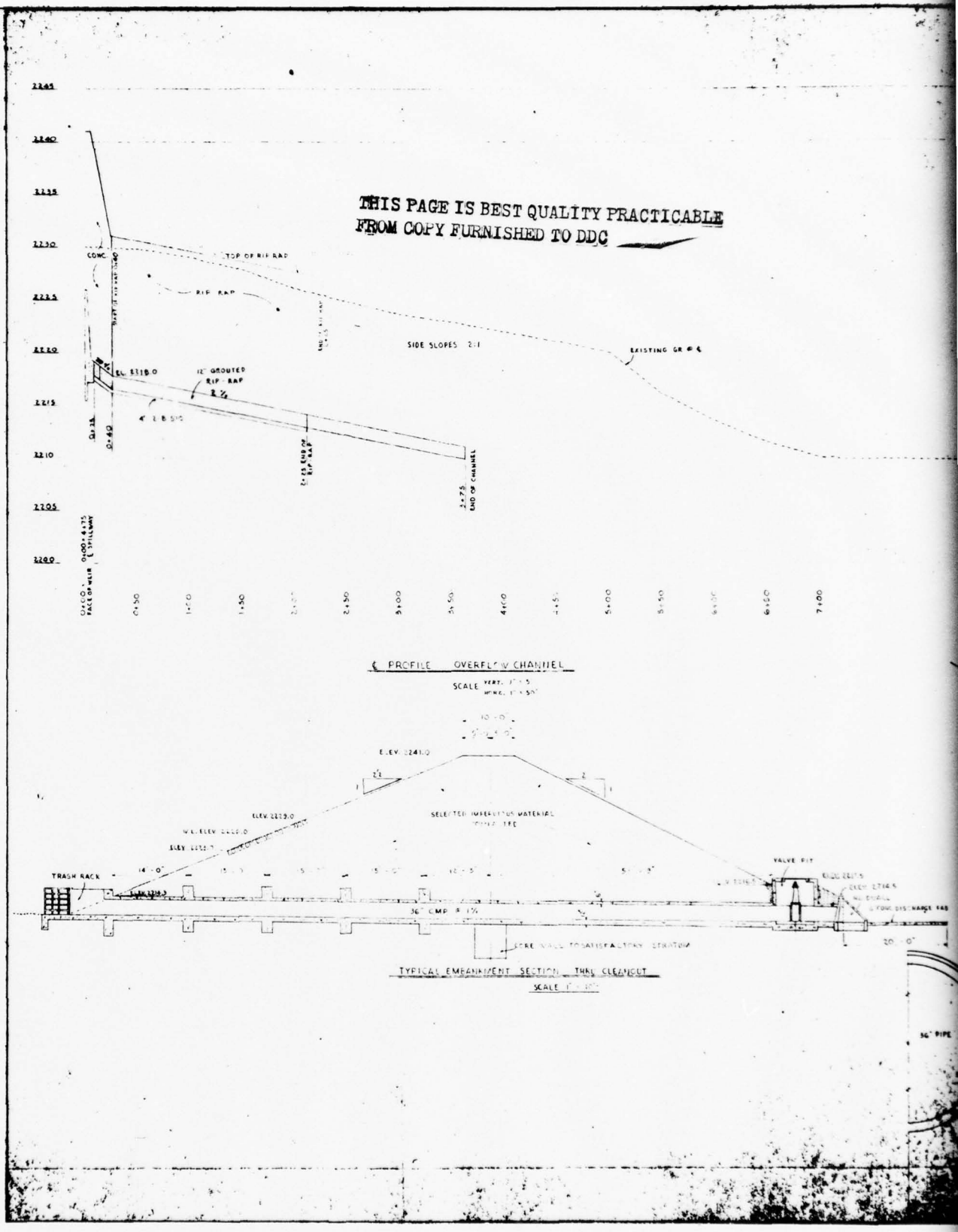
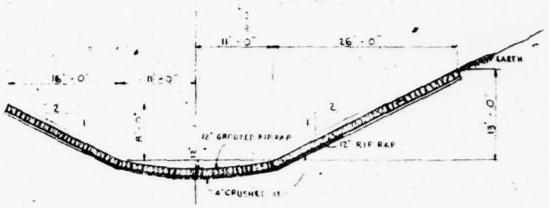
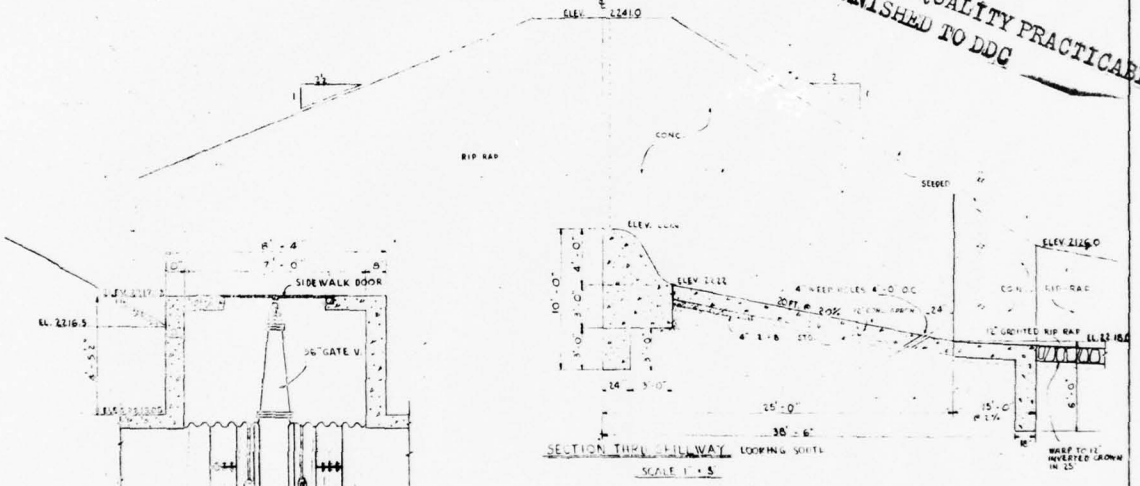
	5-25-78	APPROVED BY	JAP	7.6.78	





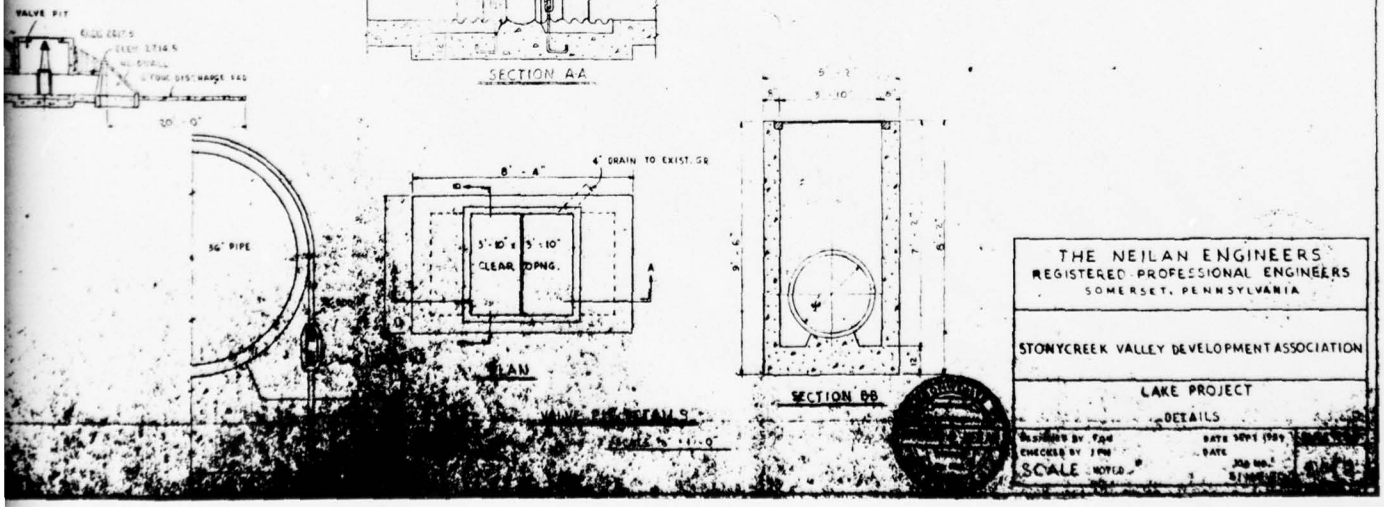
TYPICAL SECTION THRU OVERFLOW CHANNEL [illegible] LOOKING UPSTREAM
SCALE 1" = 10'-0" SIMILAR TYPE EARTH SECTION

5



SECTION AA

SECTION THRU SPILLWAY LOOKING SOUTH
SCALE 1" = 5'



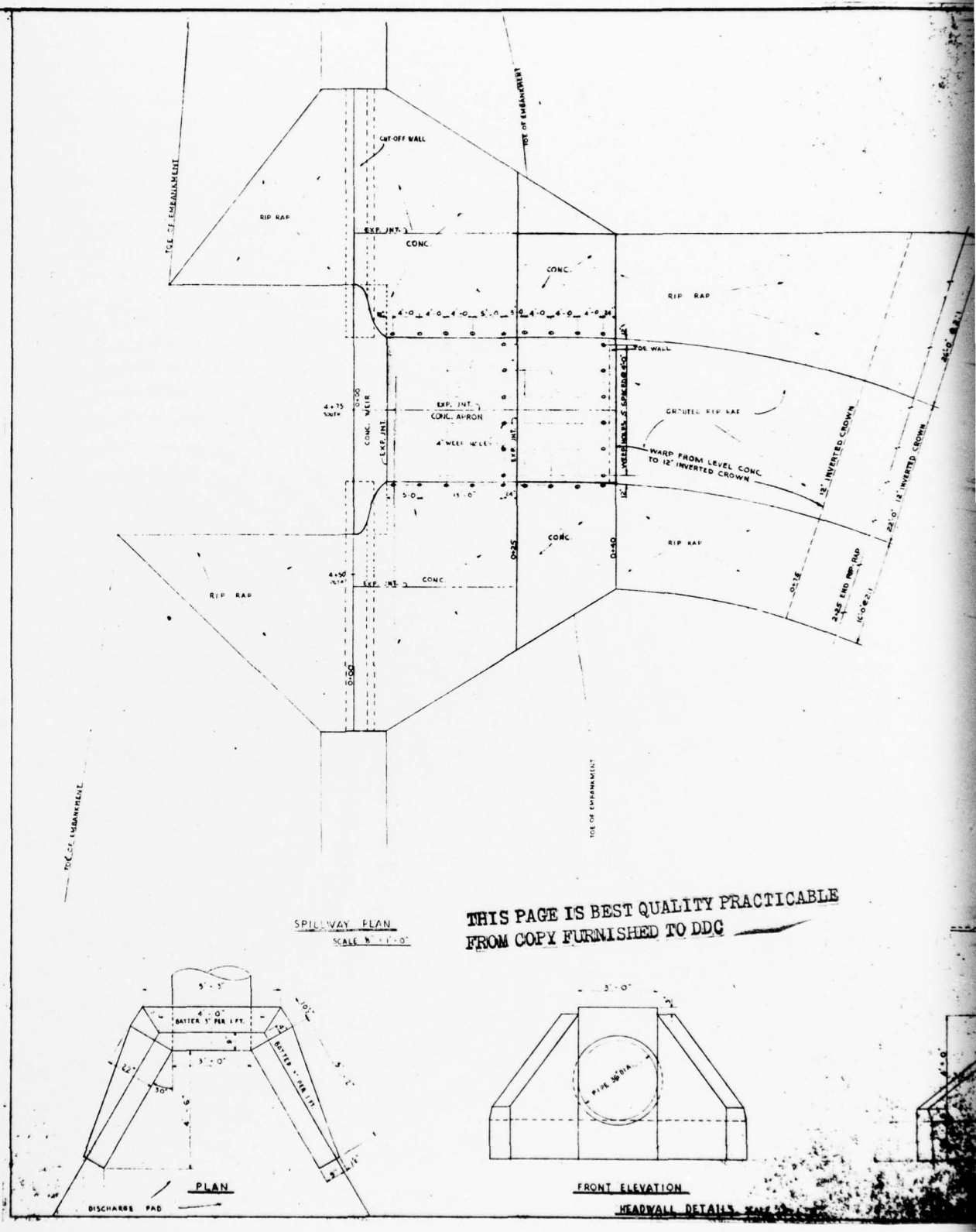
THE NEILAN ENGINEERS REGISTERED PROFESSIONAL ENGINEERS SOMERSET, PENNSYLVANIA
STONYCREEK VALLEY DEVELOPMENT ASSOCIATION
LAKE PROJECT DETAILS
DESIGNED BY TJM DATE SEPT 1969 CHECKED BY JPM DATE SCALE AS NOTED JOB NO.

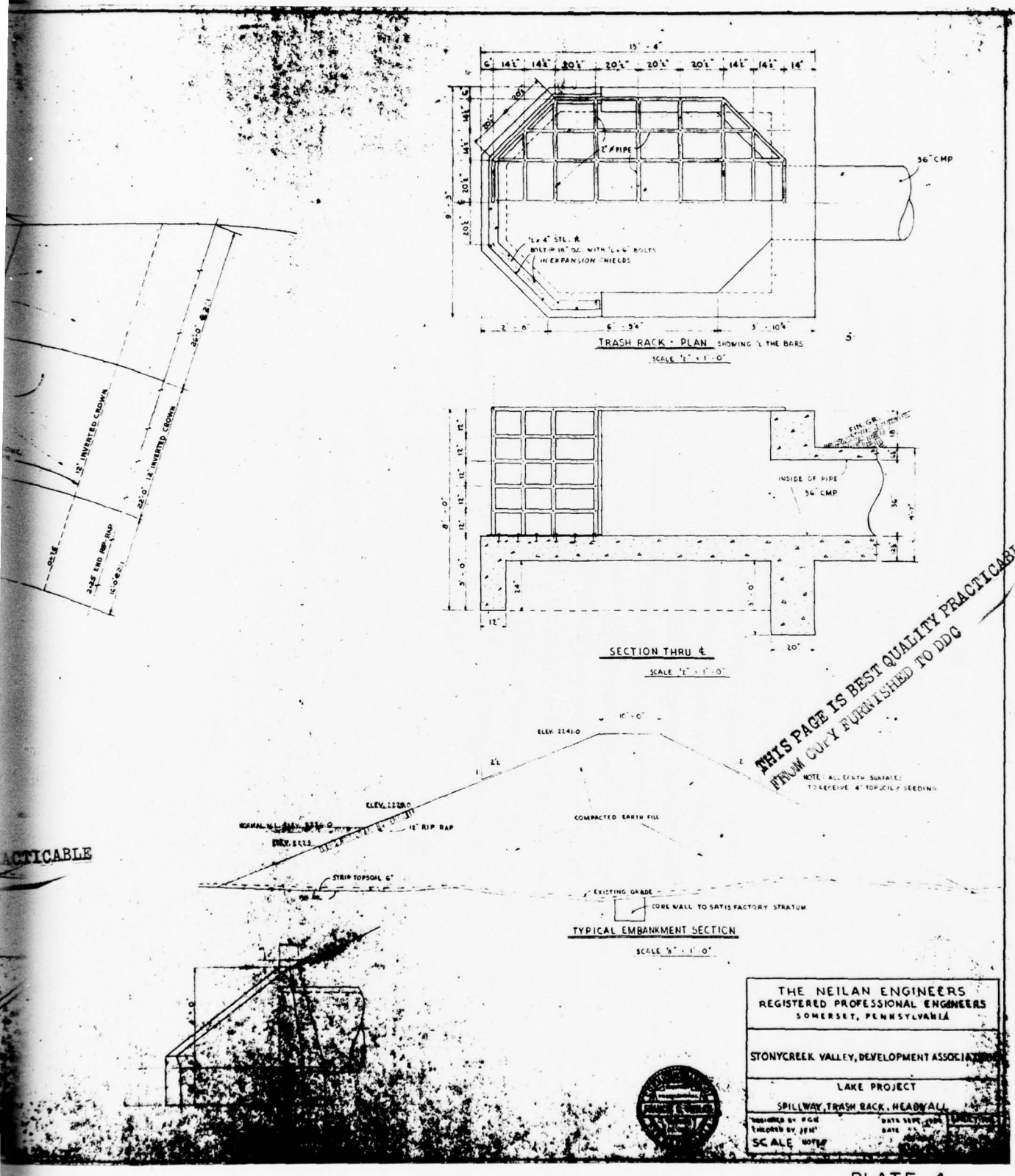
PLATE 3

D'APPOLONIA

2

DRAWN BY	G. J. G.	CHECKED BY	PJC	7-5-78	DRAWING 78- -B51
	6-23-78	APPROVED BY	JHP	7.6.78	NUMBER





THE NEILAN ENGINEERS
REGISTERED PROFESSIONAL ENGINEERS
SOMERSET, PENNSYLVANIA

STONYCREEK VALLEY, DEVELOPMENT ASSOCIATION

LAKE PROJECT

SPILLWAY, TRASH RACK, HEADWALL

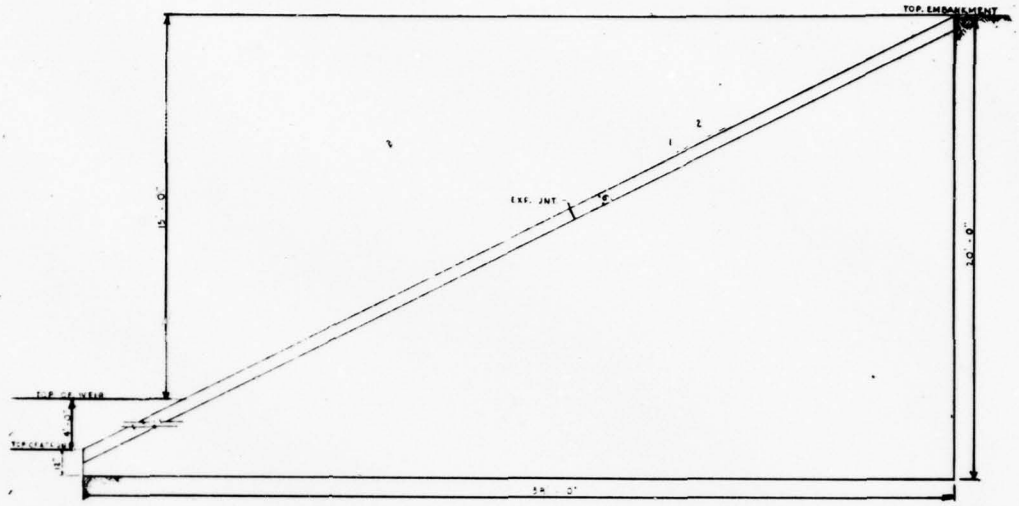
DESIGNED BY PGN
CHECKED BY JFN
DATE SEPT. 1966
DATE
SCALE NOTED

PLATE 4

D'APPOLONIA

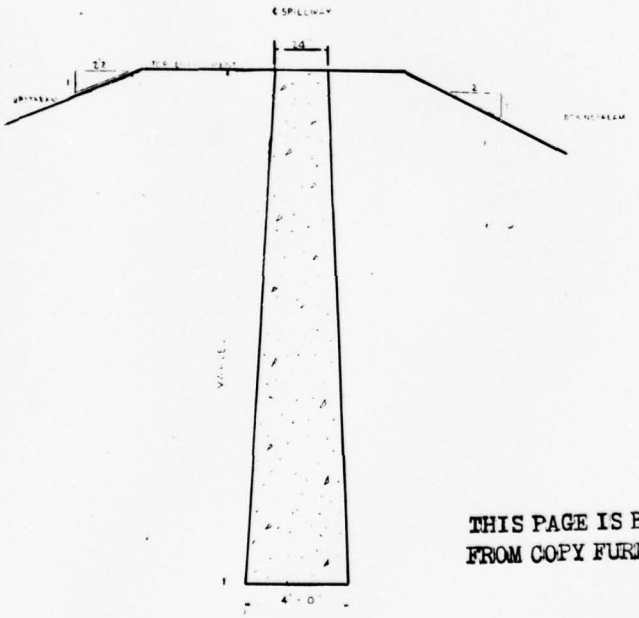
2

DRAWN BY	G.J.G.	CHECKED BY	BE	7-3-78	DRAWING NUMBER	78-B52
	6-23-78	APPROVED BY	JAP.	76.75		



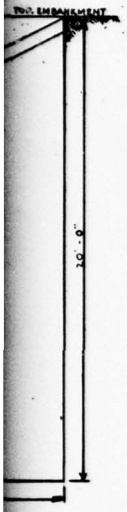
ELEV. CUT OFF WALL

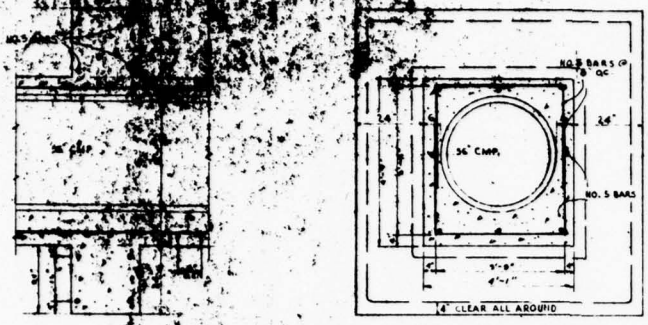
SCALE 1" = 10'-0"



TYPICAL SECT. CUT OFF WALL

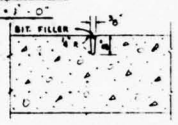
SCALE 1" = 10'-0"



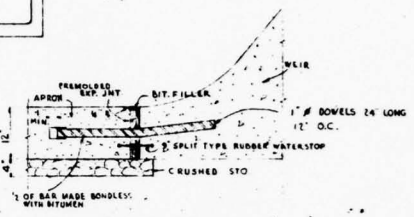


PIPE ENCASEMENT DETAILS
SCALE 1/2" = 1'-0"

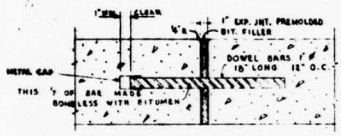
SECTION A-A



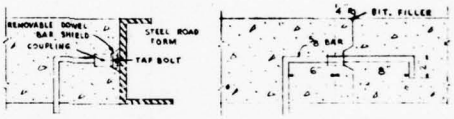
DUMMY JOINT



BOTTOM OF WEIR & APRON



EXPANSION JOINTS



PARTIAL INSTALLATION COMPLETE

CONSTRUCTION JOINT

CONSTRUCTION DETAILS
NO SCALE

THE NEILAN ENGINEERS REGISTERED PROFESSIONAL ENGINEERS SOMERSET, PENNSYLVANIA	
STONYCREEK VALLEY DEVELOPMENT ASSOCIATION	
LAKE PROJECT DETAILS	
DESIGNED BY PRN CHECKED BY JPR SCALE NOTED	DATE SEPT 1990 DATE DRAWN BY
	SHEET NO. 5

PLATE 5

D'APPOLONIA

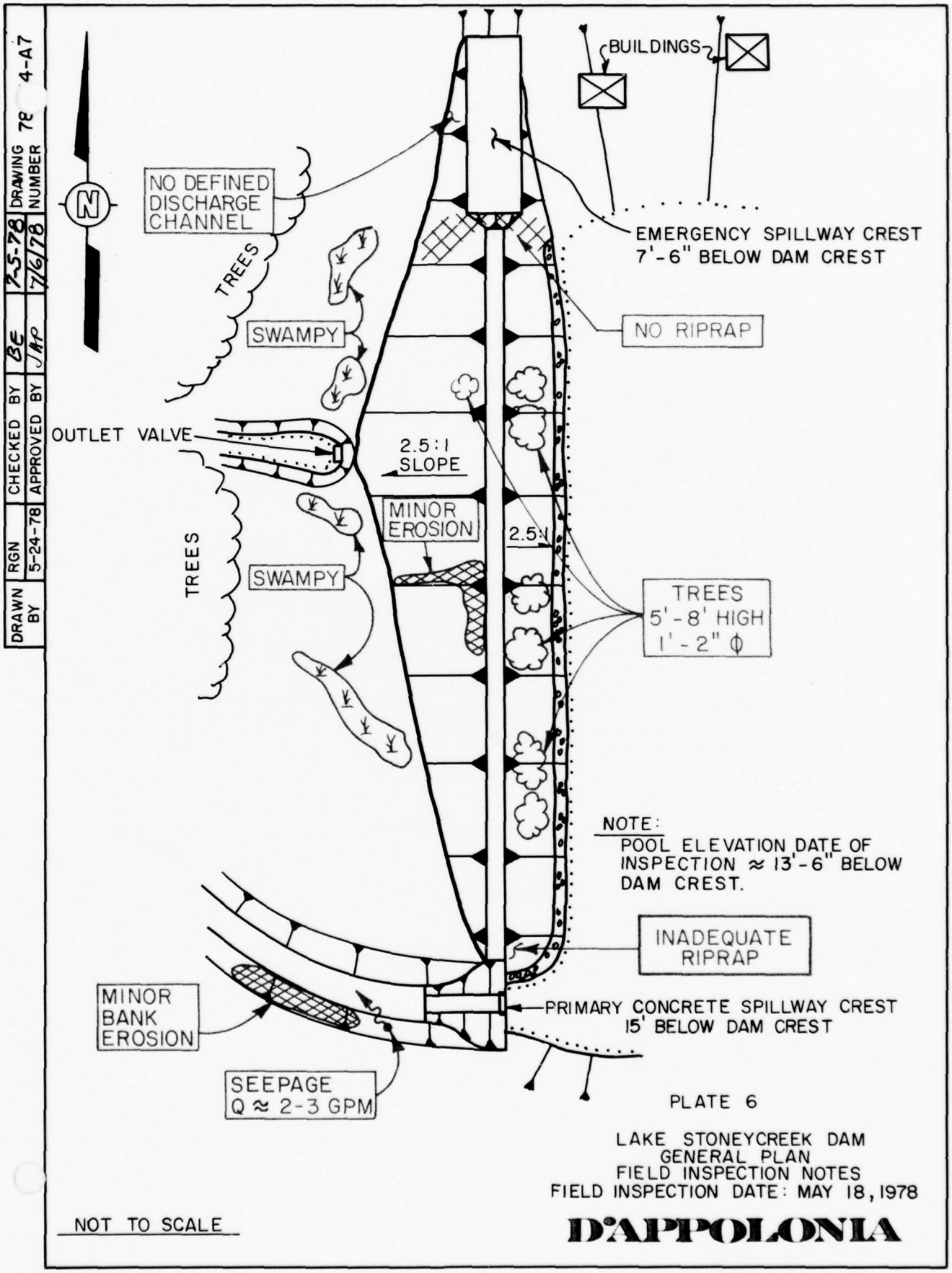


PLATE 6

LAKE STONEYCREEK DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: MAY 18, 1978

D'APPOLONIA

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

CHECKLIST
VISUAL INSPECTION
PHASE I

NAME OF DAM LAKE STONEYCREEK DAM COUNTY SOMERSET STATE PA. ID# NDI:227 DER:56-97

TYPE OF DAM EARTH FILL HAZARD CATEGORY HIGH.

DATE(S) INSPECTION MAY 18, 1978 WEATHER RAINY TEMPERATURE 50's

POOL ELEVATION AT TIME OF INSPECTION 2227.5 M.S.L. TAILWATER AT TIME OF INSPECTION _____ M.S.L.

INSPECTION PERSONNEL:

BILGIN EREL
WAH-TAK CHAN.

REVIEW INSPECTION BY:
(MAY 30 1978

ELIO D'APPOLONIA
LARRY ANDERSEN
JAMES POELLOT.

BILGIN EREL RECORDER

VISUAL INSPECTION
PHASE I
EMBANKMENT

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI: 227 DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	NONE FOUND	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	NONE FOUND	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	NONE FOUND.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	NO PERCEIVABLE MISALIGNMENT	
RIPRAP FAILURES	NO RIPRAP IN EMERGENCY SPILLWAY. RIPRAP IN PRIMARY SPILLWAY APPROACH CHANNEL IS NOT ADEQUATE.	

VISUAL INSPECTION
PHASE I
EMBANKMENT

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI: 227 DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	NO SIGNS OF DISTRESS OR SEEPAGE	
ANY NOTICEABLE SEEPAGE	SOME WET & SWAMPY AREAS BELOW TOE SEE PLATE 6 FOR LOCATIONS.	
STAFF GAGE AND RECORDER	NONE	
DRAINS	NONE	

VISUAL INSPECTION
PHASE I
CONCRETE/MASONRY DAMS

NAME OF DAM LAKE STONEYCR[illegible]K DAM
ID# NDI: 227, DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	EARTH FILL DAM ∴ N/A.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A.	

VISUAL INSPECTION
PHASE I
CONCRETE/MASONRY DAMS

NAME OF DAM LAKE STONEY CREEK DAM
ID# NDI: 227, DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	EARTH FILL DAM ∴ N/A	
STRUCTURAL CRACKING	N/A.	
VERTICAL AND HORIZONTAL ALIGNMENT	N/A.	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS STAFF GAGE OF RECORDER:	N/A.	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

NAME OF DAM LAKE STONEYCR[illegible] DAM
ID# NDI : 227, DER : 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	OUTLET PIPE IS 36-INCH CMP UNDER PRESSURE (DOWN STREAM CONTROLLED)	
INTAKE STRUCTURE	SUBMERGED NOT VISIBLE.	
OUTLET STRUCTURE	DRAIN PIPE DIRECTLY DISCHARGES INTO OUTLET CHANNEL	
OUTLET CHANNEL	TRAPEZOIDAL EARTH CHANNEL	
EMERGENCY GATE	A SLUICE GATE ON DOWNSTREAM END. OPERATED ON DATE OF INSPECTION FOUND TO BE FUNCTIONAL	SIGNIFICANT LEAKAGE BETWEEN GATE AND GATE SEAT.

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI: 227, DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	PRIMARY: TRAPEZOIDAL CONCRET OVER FLOW SECTION. SOME CRACKS IN CONCRETE SLABS. EMERGENCY: EARTH CREST (NO RIPRAP)	CRACKS IN SLABS ARE NOT SIGNIFICANT IN THEIR PRESENT EXTENT.
APPROACH CHANNEL	PRIMARY: LAKE EXISTING RIPRAP NOT ADEQUATE. EMERGENCY: LAKE (NO RIPRAP)	EMERGENCY SPILLWAY ENTRANCE AND CREST REQUIRES EROSION PROTECTION AGAINST FLOWS.
DISCHARGE CHANNEL	PRIMARY: TRAPEZOIDAL EARTH CHANNEL (SOME BANK EROSION) EMERGENCY: NO DEFINED DISCHARGE CHANNEL.	EMERGENCY SPILLWAY REQUIRES A DISCHARGE CHANNEL.
BRIDGE AND PIERS	NONE	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

NAME OF DAM LAKE STONEYCR[illegible] DAM
ID# NDI: 227, DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	NO GATED SPILLWAY ∴ N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A.	
BRIDGE PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A.	

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

NAME OF DAM LAKE STONEY CREEK
ID# NDI : 227 , DER : 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	NONE	
OBSERVATION WELLS	NONE	
WEIRS	NONE	
PIEZOMETERS	NONE	
OTHER	NONE	

VISUAL INSPECTION
PHASE I
RESERVOIR

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI: 227 DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	GENTLE SLOPES, NO SIGNS OF EROSION	
SEDIMENTATION	UNKNOWN	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

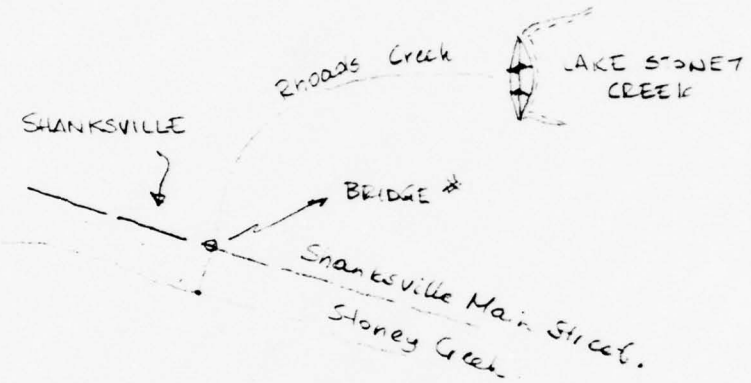
NAME OF DAM LAKE STONEYCREEK DAM
ID# ND1:227, DER: 56-97

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	ONE BRIDGE OVER THE STREAM AT SHANKSVILLE.	
SLOPES	NO SIGNS OF SIGNIFICANT EROSION.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	APPROXIMATELY 50 HOMES AND SEVERAL COMMERCIAL BUILDINGS IN SHANKSVILLE IN POTENTIAL FLOOD PLAIN POPULATION ≈ 200	

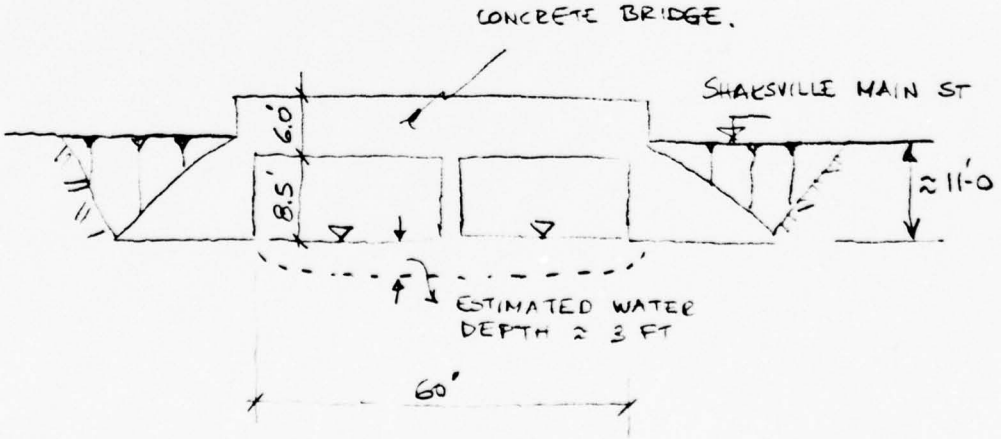
D'APPOLONIA
CONSULTING ENGINEERS, INC.

By BE Date 5-18-78 Subject LAKE STONEY CREEK DAM NDI:227 Sheet No. 1 of 1
Chkd. By WTC Date 5-18-78 FIELD INSPECTION SKETCH. Proj. No. 78-116-09

STREAM CROSS SECTION @ BRIDGE LOCATIONS
(IMMEDIATE DAMAGE REACH)



BRIDGE # 1



APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM LAKE STONEY CREEK DAM
ID# NDI : 227 DER : 56-97

ITEM	REMARKS
AS-BUILT DRAWINGS	AVAILABLE IN STATE FILES SEE PLATES 1, 3, 4 & 5
REGIONAL VICINITY MAP	SEE PLATE 2
CONSTRUCTION HISTORY	CONSTRUCTED BY ROBERT E. LONG CONSTRUCTION COMPANY OF CENTRAL CITY PA. COMPLETED : 1960
TYPICAL SECTIONS OF DAM	HOMOGENEOUS EARTHFILL SEE PLATE 3 & 4
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	SEE PLATES 3 & 4

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI : 327 DER : 56-97

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	NOT RECORDED
DESIGN REPORTS	NOT AVAILABLE
GEOLOGY REPORTS	NOT AVAILABLE
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	NOT AVAILABLE
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	NOT AVAILABLE

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI: 227 DER: 56-97

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	NONE REPORTED
BORROW SOURCES	UNKNOWN
MONITORING SYSTEMS	NONE
MODIFICATIONS	NONE REPORTED
HIGH POOL RECORDS	NOT RECORDED. TO THE BEST KNOWLEDGE OF THE SECRETARY OF OWNERS ASSOCIATION FLOW WAS ABOUT 7 FT OVER THE PRIMARY SPILLWAY DURING TROPICAL STORM AGNES IN 1972

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM LAKE STONEYCREEK DAM
ID# NDI. 227, DER: 56-97

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	NONE FOUND OTHER THAN SEVERAL STATE INSPECTION REPORTS.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	NONE REPORTED
MAINTENANCE OPERATION RECORDS	NOT RECORDED.
SPILLWAY PLAN SECTIONS DETAILS	SEE PLATES 1, 3, 4 & 5
OPERATING EQUIPMENT PLANS AND DETAILS	SEE PLATES 3 & 4

NAME OF DAM LAKE STONEYCREEK DAM

ID# NDI: 227, DER: 50-77

CHECKLIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: WOOD & PASTURE LAND (26.2 SQ. MILES)

ELEVATION; TOP NORMAL POOL AND STORAGE CAPACITY: 2000 AC-FT (EST) @ EL 2226

ELEVATION; TOP FLOOD CONTROL POOL AND STORAGE CAPACITY: SAME AS ABOVE.

ELEVATION; MAXIMUM DESIGN POOL: 6050 AC-FT (EST) @ EL 2241

ELEVATION; TOP DAM: EL 2241 (USGS DATUM)

CREST:

a. Elevation EL 2241

b. Type EARTH

c. Width 10 FT

d. Length 900 FT

e. Location Spillover RIGHT ABUTMENT (EMERGENCY SPILLWAY)

f. Number and Type of Gates NO GATES.

OUTLET WORKS:

a. Type 36-INCH CORRUGATED METAL PIPE DRAIN PIPE

b. Location MIDWAY BETWEEN ABUTMENTS.

c. Entrance Inverts 2211 FT

d. Exit Inverts 2210 FT

e. Emergency Draindown Facilities 36-INCH DRAIN PIPE.

HYDROMETEOROLOGICAL GAGES:

a. Type NONE

b. Location NONE

c. Records NONE

MAXIMUM NONDAMAGING DISCHARGE: APPROXIMATELY 27,500 CFS.

APPENDIX C

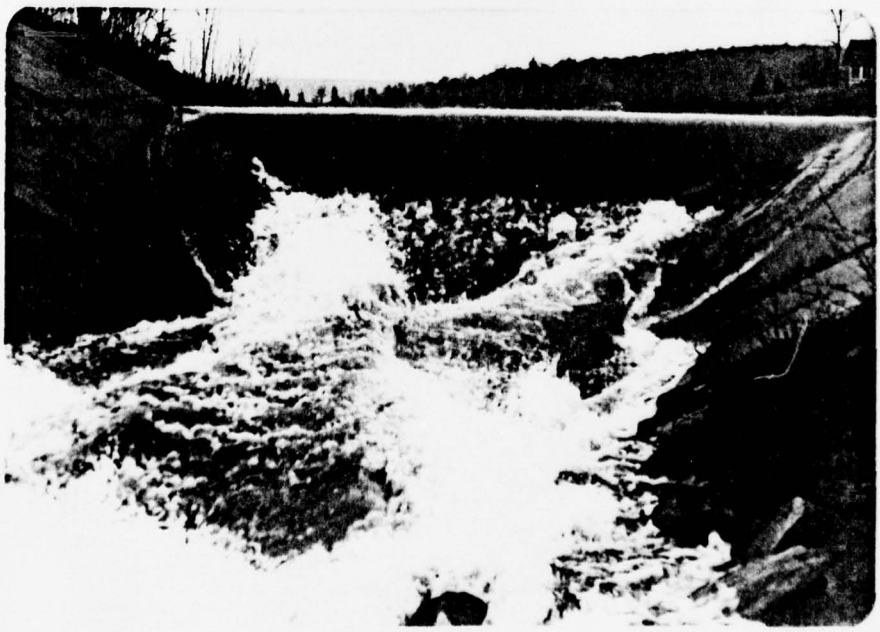
PHOTOGRAPHS

LIST OF PHOTOGRAPHS
LAKE STONEYCREEK DAM
MAY 16, 1978

PHOTOGRAPH NO.	DESCRIPTION
1	Dam crest.
2	Primary spillway.
3	Primary spillway approach channel.
4	Primary spillway discharge channel.
5	Erosion in primary spillway discharge channel.
6	Emergency spillway crest at right abutment.
7	Blow-off pipe valve (opened for inspection).
8	Blow-off pipe discharge channel.
9	Wet areas below toe.

Photograph No. 1

Dam crest.

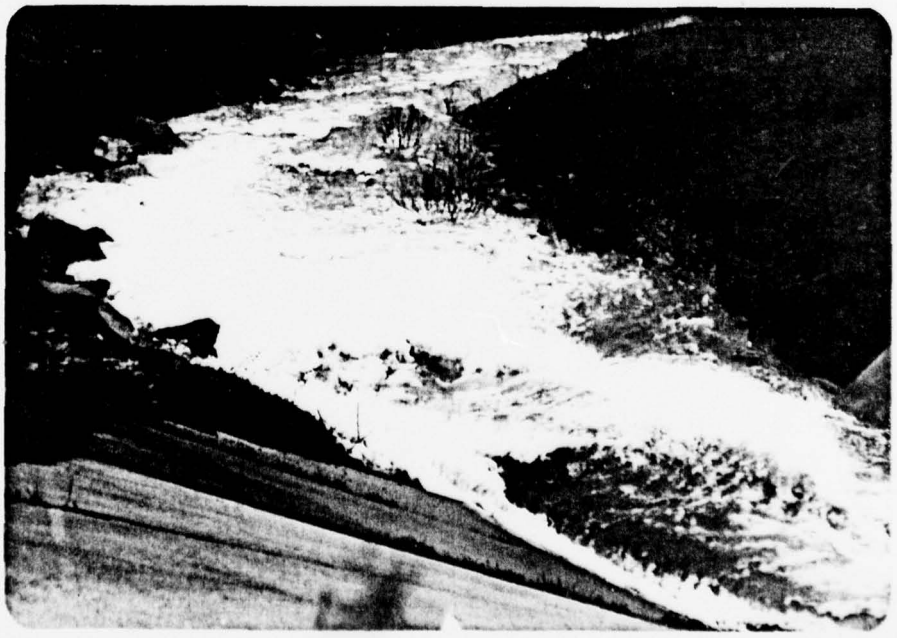


Photograph No. 2

Primary spillway.

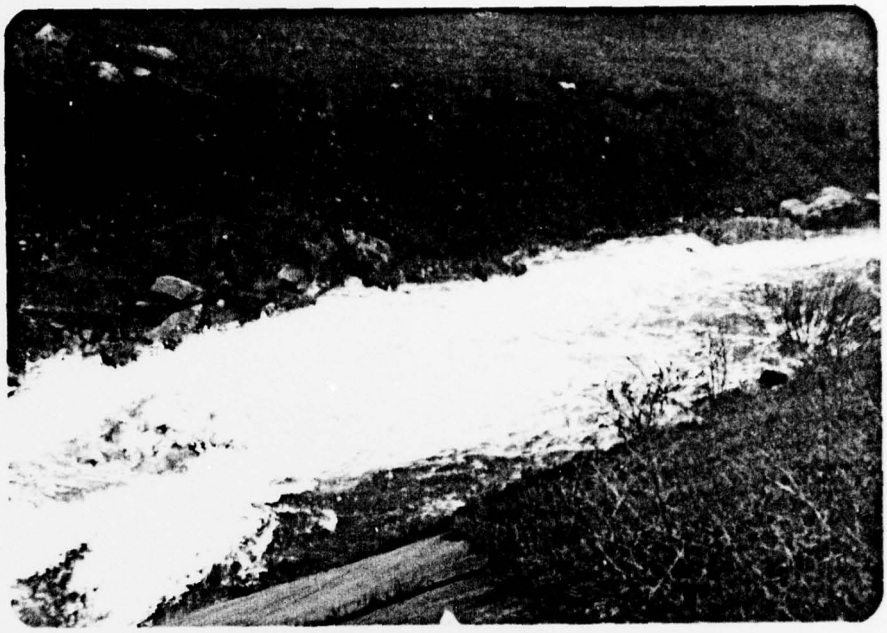
Photograph No. 3

Primary spillway approach channel.



Photograph No. 4

Primary spillway discharge channel.



Photograph No. 5

Erosion in primary spillway discharge channel.

Photograph No. 6

Emergency spillway crest at right abutment.

Photograph No. 7

Blow-off pipe valve (opened for inspection).

Photograph No. 8

Blow-off pipe discharge channel.

Photograph No. 9

Wet areas below toe.

APPENDIX D
CALCULATIONS

D'APPOLONIA
CONSULTING ENGINEERS, INC

By WTC Date 5-23-78 Subject LAKE STONYCREEK DAM Sheet No. 1 of 4
Chkd. By BE Date 6/30/78 HYDROLOGY & HYDRAULICS Proj. No. 78-114-09

DAM: LAKE STONYCREEK DAM

WATERSHED AREA: A = 25.87 SQ. MILE (Previously Reported)
IN WHICH A_1 = 14.85 SM ABOVE INDIAN LAKE DAM
A_2 = 11.02 SM BETWEEN INDIAN LAKE DAM AND LAKE STONYCREEK DAM

MEASURED AREA FROM USGS
A = $A_1 + A_2$ = 26.2 SQ MILES (USED

INFLOW HYDROGRAPH (BASED ON CORP OF ENGR CHARTS AND NEGLECTING INDIAN LAKE DAM)

BASIN: OHIO RIVER BASIN

TOTAL TIME, T = 61 HOURS

PMF PEAK FLOW, q = 1130 cfs / SQ. MILE

PMF Peak Flow Q = q.A = 29606 cfs
say 30,000 cfs.

VOLUME OF INFLOW

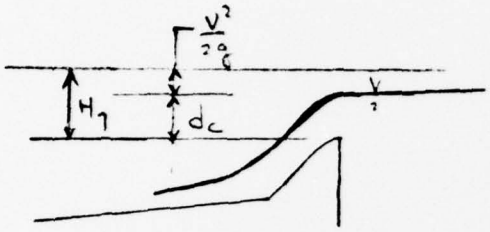
$$V_i = \frac{1}{2} \times T \times 3600 \times Q$$
$$= \frac{1}{2} \times 61 \times 3600 \times 30{,}000 \times \frac{1}{43560}$$
$$= 75620 \text{ ACRE-FT}$$

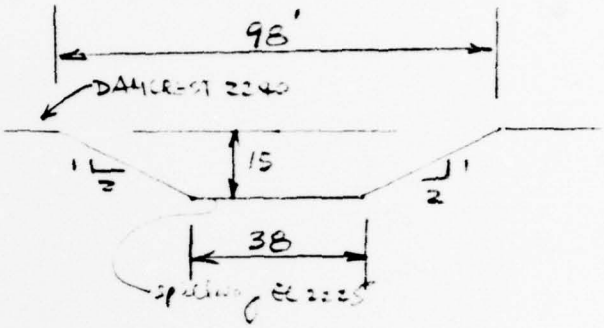
EQUAL TO 54" RUNOFF / 61 hr,
CHANGE TO 26" RUNOFF / 29.4 hr
V_i = 36331 ac-ft say 36,500 ac-ft.

SPILLWAY CAPACITY

PRIMARY SPILLWAY
TYPE: CONCRETE TRAPEZOIDAL SPILLWAY W/ OGEE CONTROL SECTION
SIZE: BOTTOM 38 FEET, TOP 98 FEET, TOTAL DESIGN HEAD 15 FEET (AS DESIGNED). OGEE 4' ABOVE APPROACH CHANNEL BOTTOM

PRIMARY SPILLWAY CAPACITY





DETERMINE SPILLWAY CAPACITY USING CRITICAL DEPTH & LOSSES

$$\frac{Q^2}{g} = \frac{a^3}{T}$$

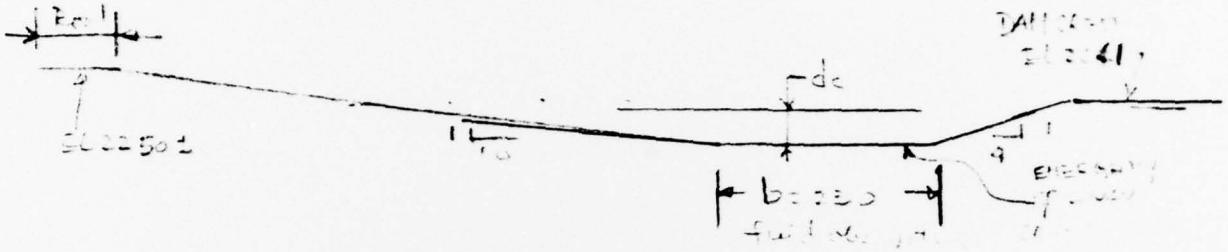
where $a = (b + zd_c)\,d_c = (38 + 2d_c)\,d_c$ = AREA,

T = Top Width $= (b + 2zd_c) = 38 + 4d_c$

$$Q = \sqrt{\frac{a^3}{T}\,g} = \sqrt{\frac{[(38+2d_c)\,d_c]^3}{(38+4d_c)}} \times 32.2 \text{ cfs}$$

d_c, ft	a, ft^2	T, ft	Q, cfs	$V_c = \frac{Q}{a}$, fps	$\frac{V^2}{2g}$, ft	$d_c + \frac{V^2}{2g}$, ft	
1	40	42	222	5.5	0.5	1.5	
2	84	46	644	7.7	0.9	2.9	
3	132	50	1217	9.2	1.3	4.3	
4	184	54	1927	10.5	1.7	5.7	
5	240	58	2770	11.5	2.1	7.1	
6	300	62	3745	12.5	2.4	8.4	
7	364	66	48507	13.3	2.8	9.8	
8	432	70	6090	14.1	3.1	11.1	
9	504	74	7464	14.8	3.4	12.4	
10	580	78	8975	15.5	3.7	13.7	
11	660	82	10625	16.1	4.0	15.0	← MAX HEAD

EMERGENCY SPILLWAY



$$a = \left[b + \tfrac{1}{2}(Z_1 + Z_2)\, d_c\right](d_c) = \left[230 + 7d_c\right] d_c$$

$$T = b + (Z_1 + Z_2)\, d_c = 230 + 14\, d_c$$

$$Q = \sqrt{\frac{a^3}{T}\, g} = \sqrt{\frac{\left[(230 + 7d_c)\, d_c\right]^3}{230 + 14 d_c} \times 32.2}$$

d_c, ft	a, ft^2	T, ft	Q, cfs	$V_c = \frac{Q}{a}$, fps	$\frac{V^2}{2g}$, ft	$d_c + \frac{V^2}{2g}$, ft
1	237	244	1325	5.6	0.5	1.5
2	488	258	3804	7.8	0.9	2.9
3	753	272	7109	9.4	1.4	4.4
4	1032	286	11124	10.8	1.8	5.8
5	1325	300	15801	11.9	2.2	7.2
5.2	1385	303	16813	12.1	2.3	7.5

Max Discharge = 16813 cfs

DAM CREST 2241
Spillway 2233.5
7.5

TOTAL Discharge = 10625 + 16813 = 27438 cfs

Say 27400 cfs (CONSERVATIVE)

D'APPOLONIA
CONSULTING ENGINEERS, INC

By RJTC Date 5-23-78 Subject LAKE STONYCREEK DAM Sheet No. 4 of 4
Chkd. By BE Date 6/30/78 HYDROLOGY & HYDRAULICS Proj. No 75414-09

RESERVOIR STORAGE CAPACITY

FROM USGS "STOYSTOWN & CENTRAL CITY"

EL 2227 (lake) A = 170 acres
EL 2240 A = 354 acres ⇒ ESTIMATE TOP/DAM 2241
A = 4 300 ac

$$\Delta V = \frac{13}{3}(170 + 354 + \sqrt{170 \times 354})$$

$$= 3308 \text{ Ac-ft}/13\text{ft}$$

$$= 270 \text{ Ac-ft/ft}$$

V_R (Between 2226 & 2241, $\Delta H = 15$ ft)

$$= 15^{ft} \times 270^{ac\text{-}ft/ft}$$

$$= 4050 \text{ ac-ft}$$

REQ'D Reservoir Capacity for PMF

$$V = \left(1 - \frac{\text{MAX Spillway Capacity } Q_s}{\text{PMF Peak Flow, } Q}\right)(\text{Vol of inflow, } V_i)$$

$$= \left(1 - \frac{27400}{30000}\right)(36500)$$

$$= 3160 \text{ ac-ft} \quad < 4050^{ac\text{-}ft}_{av.}$$

SPILLWAYS CAN PASS PMF WITHOUT OVERTOPPING

APPENDIX E

REGIONAL GEOLOGY

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REGIONAL GEOLOGY

Lake Stoneycreek Dam is located in the Berlin-Salisbury Syncline and between the Negro Anticline on the west and the Savage Anticline on the east. These anticlines trend north-northeast. The rock strata underlying the dam and reservoir are members of the Conemaugh Group (Pennsylvanian Age). The Conemaugh Group consists primarily of gray to brown shaly siltstones and sandstones. The Conemaugh Group contains five minable coal seams. Based on limited information, it is estimated that the upper two coal seams, the Wellersburg and the Lonocomy, lie above the reservoir level. The other three coal seams of the Conemaugh Group which are estimated to lie below the reservoir level appear to be too thin to be deep mined. The coal seams of the underlying Allegheny Group occur at depths greater than 600 feet.